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ABSTRACT

The complexity of technology training for teachers can be partially explained in terms of three phenomena: the historical resistance of teachers to use media, the nature of teaching itself, and the life cycle of technological innovations. Factors that influence teachers' use of technology include: accessibility of hardware and software, administrative expectations and support for the implementation, and adaptability of classroom and work settings. As practical professionals, teachers are often suspicious of new claims and the implementation of new ideas without proof of effectiveness. Teachers tend to adopt a new technology when that technology helps them do what they are currently doing better; thus, they may be seen as reinforcing the status quo. In addition to a cautious attitude engendered by teaching and the historical and cultural resistance to change, the influx of computer games and the perception of video and film as entertainment illustrate how computer technology can be suspect as a legitimate educational tool. Suggestions for teacher technology training include: provide teachers with numerous opportunities for training and practice; provide administrative support for training and for trying new approaches with technology; acknowledge the professional concerns of teachers and their need for practicality while encouraging risk-taking; and provide post-training follow-up. (ND)

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The Role of Skepticism in Preparing Teachers for the Use of Technology
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Address to "Education for Community": A Town and Gown Panel Discussion
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Speaking to technology groups is like preaching to the choir. Everyone knows the message and believes in it. Speaking to and training teachers about technology is different; some of the audience already believes in the message, but the majority are both skeptical and fearful. In preparing for this discussion, I began to reflect on my own relationship with computers and the consequent mission of preparing other teachers to use this technology. When I was a 4th grade teacher in a small rural central Ohio school district, my principal approached me and some other teachers about attending a Radio Shack® training course for teachers. Mind you, this was in 1981, when Apple® computers and Radio Shack® computers had 24 or 48 K of memory, hooked to your television set, and could use a tape recorder for a tape drive. Although I was one of the more confused members of the training class, which by the way focused on teaching BASIC, there was something intriguing about those machines. When I saw examples of software that kept grades, tutored spelling, and simulated problem solving, I was hooked. Membership in the programming course dropped, but I hung in there and was rewarded by a new Apple IIe® computer in my classroom. Soon I had my class grades automated that I shared at parent conferences. The parents in that rural community were supportive of computer use; many saw it as a way to manage their farms. But I was disappointed in my colleagues' skeptical reactions. Fortunately I began to listen to their doubts and negative responses and wonder why they were so resistant to the technology by which I felt so empowered.

Even after a long journey through graduate school, industrial research, and current travels through college teaching, I still struggle a variety of emotions: the enthusiasm I

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have, and see in others, for the potential of computers in education and the confusion and respect I have for those who are reluctant to adopt computer technology for their classrooms. I have decided, however, that listening to the skeptics keeps the enthusiastic technophiles more honest to the task of making technology serve the education of our children, rather than having education serve the technology.

The Nature of Skepticism

A dictionary definition and some quotations help identify the nature of skepticism. Skepticism is the position that knowledge is limited and is denoted by a questioning attitude. The Spanish philosopher, Miguel de Unamuno, once said that "The skeptic does not mean him who doubts, but him who investigates or researches..." That seems healthy to me. I especially like Robert Frost's slant on skepticism: "'Skepticism,' is that anything more than we used to mean when we said, 'Well, what have we here?'" (Microsoft Bookshelf, 1995).

What I first took to be unhealthy skepticism on the part of my colleagues proved to not be skepticism at all, for that would require the person to be open to the chance of other knowledge. Unhealthy skepticism is really fear and the inability to allow for new ideas. It is what George Kelly called "hardening of the categories" (Kelly, 1963). We can effectively resist change to our beliefs. At the school where I taught, I witnessed both skepticism and hardening of the categories. Acknowledging both phenomena helps us understand how we should and could approach the training of teachers to use, wisely use, technology. In serving pre-service and in-service teachers, there is a complex audience of early adopters, skeptics, and resisters (these same categories apply to teacher educators too, which is part of the problem). How do we address this complex audience?

The Nature of Teaching and the Impact on Technology Adoption

The complexity of technology training for teachers can be partially explained in terms of three phenomena: the historical resistance of teachers to use media, the nature of teaching itself, and the life cycle of technological innovations. Larry Cuban in his study of teachers and their use of media in their classrooms (Cuban, 1989) found that three factors influenced teachers' use of machines: accessibility of hardware and software (is the equipment available and easy to use), implementation of the innovation (is there administrative expectation and support), and classroom and work settings (is the tool versatile and adaptable and does the setting accommodate the tool). Picture in your minds the successful technology using schools that you have seen....how many fit the criteria just mentioned? Picture the non-using schools and you will see the absence of these critical criteria.

The life cycle of innovations is predictable and explains the cry of "fad" that we hear so much from educators. Innovations typically have a birth, used in light of a current ideas, they die from lack of interest or innovative application, and then they are resurrected in a new form (DeBloois, 1982, p. 144). This life cycle intertwines itself throughout the structure of society and education and causes fortunes to be made and lost, technology to be used and misused, and professors to be published by academic journals and scorned by practicing teachers. As practical professionals, teachers are suspicious of new claims. Some of the fault lies with the those who implement new ideas without proof of effectiveness and some fault lies with the technocists who invent the technology. The danger of pursuing technology for technology's sake is illustrated by a quote from the physicist Oppenheimer: "When you see something that is technically sweet, you go ahead and do it and you argue about what to do about it only after you have had your technical success. That is the way it was with the atomic bomb" (Microsoft Bookshelf).

Drawing from his research, Cuban claims that teachers adopt a technology when that technology helps them do better what they are currently doing (Cuban, 1989, p. 66). This may seem appropriate but as a result they continue to use technology as an aid to teaching. They are consequently reinforcing the status quo. Teaching itself engenders a cautious attitude towards change (p. 60). Add to this cultural scenario a perception of video and film as entertainment and therefore to be suspicious as teaching tools (p. 61). Given the influx of computer games and simulations, one can see how computer technology can be suspect as a legitimate educational tool. Given the historical and cultural resistance to change, how are we going to expand the potential that computer technology has for educating our children? This is not an easy task. Cuban says, "To question computer use in schools is to ask what schools are for, why teachers teach certain content, how they should teach, and how children learn" (p.98).

So what does this mean for the technology training of teachers? Here are some concrete guidelines based upon what we know about the life cycle of technology, teacher adoption of innovations, and the nature of teaching.

- Provide teachers with numerous opportunities for training and practice.
- Provide administrative support for training and for taking risks to try new approaches with technology.
- Acknowledge the professional concerns of the teacher and base implementation on evidence of what works.
- Acknowledge the teachers' need for practicality while encouraging risk-taking.
- Provide post-training follow-up.

The Invitation

If we want to change pedagogy, that means we have to change a teacher's beliefs that he or she has practiced and seen practiced for a long time (Cuban, p.109). If, as teacher educators, we want to change a belief system, we had better be grounded in scientific, practical and artful evidence that the change will serve the client. Appropriate decision-making must be preceded by appropriate question-asking, and there must be appropriate resources from which the answers emerge (Baker, 1986). We also ought to consult those who work more directly with the children: the teachers. An anonymous quote is an excellent reminder of our interdependency: "None of us is as smart as all of us." "All of us" includes teachers, teacher educators, Boards of Education, parents and all other aspects of the community. We all have a stake in the education of our children and their preparation to live productive lives in a democratic society. I invite us to be skeptics, to ask "what do we have here?", not be doubters but collaborative investigators of the opportunities that technology provides us.

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